

REMARKS/ARGUMENTS

35 USC 102(b)

Claims 17-18, 21-25, 27, and 30-32 were rejected under 35 U.S.C. § 102(b) as being anticipated by Bass, Jr et al. (U.S. Patent No. 4,870,470) and Zheng et al. (U.S. Patent No. 7,015,101). Claim 32 is cancelled without prejudice. The applicant respectfully disagrees for the reasons discussed below.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (MPEP § 2131). As can be gleaned from the cited case law, the requirement is that each element must be either expressly or inherently described. In examining the portion of the cited reference that the examiner has referred the applicant to, Neither Bass nor Zheng discloses every limitations as claimed.

The reference Bass does not disclose every claimed limitations

The Office Action stated “Bass, Jr. et al. shows the invention as claimed including a non-volatile memory structure comprising....a gate electrode layer 35 formed on the top of the gate dielectric layers” (page 3, paragraph 1). Applicant respectfully disagrees.

The independent claims 17 and 23 claim a plurality of gate dielectric layers on a substrate, wherein a source/drain electrode are formed at the substrate, and a gate electrode layer is formed on the plurality of gate dielectric layers. The independent claims 17 and 23 further claim that at least one hetero element is planted on the top or the third dielectric layer.

The structure 35 of Bass is not a gate electrode layer as alleged in the Office Action. The structure 35 of Bass is a charge injection structure (column 8, lines 3-20). As illustrated in figure 7 and column 8 lines 3-20 of Bass, the structure 35 is a charge injection structure on the top of the barrier layer 25. Hence, the structure 35 is neither a gate electrode layer nor on top of a gate dielectric layer. Therefore, Bass as referred in the Office Action does not disclose every limitations as claimed in claims 17 and 23. Since Bass as referred in the Office Action does not disclose every limitations as claimed in claims 17 and 23, Bass cannot anticipate the dependent claims 18, 21-22, 24-25, 27, and 30-31. Hence Applicant respectfully request issuing allowance for the reasons stated.

The scope of the Bass inherency does not disclose the claimed limitations

The Office Action further alleged that the source/drain electrodes will inherently needed to be formed in order to enable interconnection with other devices (page 3, last 2 lines of paragraph 1). Applicant respectfully disagrees for the reasons below.

The independent claims 17 and 23 claim a source/drain electrode formed at the substrate wherein the substrate is underneath of the gate dielectric layers. The particular location of the drain/source and the substrate as claimed is not inherent in the art. As stated in the Office Action, the source/drain electrode will inherently needed for interconnection, while this is true, the scope of this inherency does not support the structure and location as claimed in claims 17 and 23. Therefore, the inherency as stated in the Office Action does not disclose every limitations as claimed in claims 17 and 23. Since the inherency as stated in the Office Action does not disclose every limitations as claimed in claims 17 and 23, Bass¹ cannot anticipate the dependent claims 18, 21-22, 24-25, 27, and 30-31. Hence, Applicant respectfully request issuing allowance for the reasons stated.

The reference Zheng does not disclose every claimed limitations

The Office Action stated “Zheng shows the invention as claimed....one hetero element provides in the gate dielectric layer...”(page 3, last paragraph). Applicant respectfully disagrees for the reasons below.

Zheng discloses forming a first gate dielectric layer, a second gate dielectric layer, and a third gate dielectric layer (figure 9). Zheng further discloses implanting ion trap on the second gate dielectric layer (figure 9, step 910). Zheng does not disclose implanting on the top layer or the third layer as claimed in the claims 17 and 23. Since Zheng as referred in the Office Action does not disclose implanting on the top layer or the third layer, Zheng does not disclose the structure from planting on the top layer or third layer. Therefore, Zheng as stated in the Office Action does not disclose every claimed limitations as claimed in claims 17 and 23. Since Zheng as stated in the Office Action does not disclose every limitations as claimed in claims 17 and 23, Zheng cannot anticipate the dependent claims 18, 21-22, 24-25, 27, and 30-31. Hence, Applicant respectfully request issuing allowance for the reasons stated.

¹ Bass, Figure 7, structures 60 and 65 are diffusion regions.

The scope of the Zheng inherency does not disclose the claimed limitations

The Office Action further alleged that the source/drain electrodes will inherently needed to be formed in order to enable interconnection with other devices (page 3, last line). Applicant respectively disagrees for the reasons below.

The independent claims 17 and 23 claim a source/drain electrode formed at the substrate wherein the substrate is underneath of the gate dielectric layers. The particular location of the drain/source and substrate as claimed is not inherent in the art. As stated in the Office Action, the source/drain electrode will inherently needed for interconnection, while this is true, the scope of this inherency does not support the structure and location as claimed in claims 17 and 23. Therefore, the inherency as stated in the Office Action does not disclose every limitations as claimed in claims 17 and 23. Since the inherency as stated in the Office Action does not disclose every limitations as claimed in claims 17 and 23, Zheng cannot anticipate the dependent claims 18, 21-22, 24-25, 27, and 30-31. Hence, Applicant respectively request issuing allowance for the reasons stated.

35 USC 103(a)

Claim 26 is rejected under 35 USC 103(a) as being unpatentable over Bass in view of Walker et al. (U.S. Patent No. 5,371,027) and Naguib et al. (U.S. Patent No. 4,683,645), and unpatentable over Zheng in view of Walker and Naguib. Applicant respectfully disagrees for the reasons below.

As stated above, neither Bass nor Zheng disclose every claimed limitations in the parent claims of claim 26. Neither Walker nor Naguib disclose those limitations as discussed above in the 102 rejection arguments. Hence, the references on record do not every limitations as claimed, and Applicant respectfully request issuing allowance for the reasons stated.

Restriction/Election

The Office Action further states an election/restrictions requirement for the reason that the newly submitted claims 19-20, 28-29, and 33 are not directed to the patentably distinct embodiment where the dielectric layers are an oxide, a nitride, and another oxide layer, respectively.

The Office Action further states that since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by the original presentation. Applicant respectfully disagrees with Examiner and requests for rejoin. Claim 33 is cancelled without prejudice. Claims 19 and 20 are depending claim 17; claims 28 and 29 are depending on claim 23; and claim 33 (now cancelled) is depending on claim 32 (now cancelled).

MPEP 803.02 provides that every restriction requirement must have two criteria: the invention, as claimed, must be independent or distinct inventions, **and** there would be serious burden on the examiner if restriction were not required.

Claims 19-20, 28-29, and 33, as claimed, are not independent and distinct

Claim 19-20 and 28-29, which depend on claims 17 and 23; and claim 33 (now cancelled) is depending on claim 32 (now cancelled). Claims 19-20, 28-29, and 33, along with the remaining claims, claim a non-volatile memory comprising a plurality of gate dielectric layers; thus, there is a disclosed relationship between the claims 19-20, 28-29, 33, and rest of the claims. Therefore claims 19-20, 28-29, and 33 are not independent. Since the claims 19-20, 28-29, and 33 are related to other claims, they are not distinct and patentable over other claims.

There would not be serious burden on the examiner if restriction were not required

Claim 19-20 and 28-29, which depend on claims 17 and 23, claim silicon carbide and aluminum oxide. The claimed non-volatile memory is not classified under different classifications. Thus, they do not impose serious burden on the examiner.

Claim 33 claims a fourth dielectric layer. Neither claim 32 nor claim 33 claims the dielectric layers as an oxide, a nitride, or another oxide layer as examiner indicated in the restriction reason. Yet, claim 32 was examined on the merit.

MPEP 819 is not applicable

MPEP 819 provides that a shifting to the previously nonelected claims are not permissible. Claims 19-20, 28-29, and 33 are not previously non-elected claims. The prior election was made between a product and process. Claims 19-20, 28-29, and 33 are claiming products along with rest of the pending claims. Thus, there is no shifting.

Improper reason of restriction requirement

The Office Action states the reason for the restriction is that the newly submitted claims 19-20, 28-29, and 33 are not directed to the patentably distinct embodiment where the dielectric layers are an oxide, a nitride, and another oxide layer, respectively. The Office Action further states that a constructive election is made based on the original presentation. To the contrary, the original independent claim 12 (now cancelled) is not limited to the embodiment, as alleged in the Office Action, where the dielectric layers are an oxide, a nitride, and another oxide layer, respectively. Thus, a constructive election cannot be made based on the original presentation.

35 USC 101

The 35 USC 101 provides that each invention is only entitled of one patent. Improper restriction provides unjustified extension of patent term by allowing claims in a second patent not patentably distinguishing from claims in the first claim. Claims 19-20, 28-29, and 33 are not patentably distinguishing from the rest of claims. A restriction will unjustifiably extend the patent term as mandated in the 35 USC 101.

References on record do not disclose the claimed limitations

Claims 19 and 28 claim a layer of silicon carbide; and claims 20 and 29 claim a layer of aluminum oxide; and claim 33 is now cancelled. None of the references on record disclose the silicon carbide layer and aluminum oxide layer. For the reason above, Applicant respectfully request rejoining the claims 19-20 and 28-29, and issuing allowance accordingly.

Applicant: Jeng et al.
Application No.: 10/758,132

Conclusion

For the reasons stated above, Applicant respectfully requests a favorable re-consideration on all pending claims, and to issue allowance for the reason stated above.

Respectfully submitted,
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